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Professor Luis W. Alvarez
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Dear Dr. Alvarez:

I was pleased to get your detailed letter of September 20 after I had been "floored" by your surprising reply or comment (handwritten) at the bottom of copy of my reply of September 12. In the very last paragraph of yours of the 20th you state that you have reread mine of the 12th and that you interpret it as an attempt to have you change your letter to agree with Mr. Wyckoff. If you had also reread your repeated references in yours of August 15 to the "oscillations" of Mr. Zapruder's "neuromuscular system" and realized that no one could believe --- as you still do not --- that frame 313 could show any "oscillations of Zapruder's neuromuscular system", you would have realized that I thought you had merely misspoken yourself when you alluded to pulses starting at Frame 313. You now postulate that , unlike Frames 181 or 182 and 220 or 221, Frame 313 is due to a shock wave. So you see my motive was (without seeing the graph you have now sent me) to correct what I thought was an inadvertent misstatement by you or a typographical error of your secretary.

If the graph that Mr. Wyckoff has worked out --- and I hope you can get a copy of his graph --- is the same as yours, I fail to see why he ignored the starting points at 181-182 and 220-221. You say that you assume it takes 1/3 second for the neuromuscular system to respond to a stimulus. As each Frame is 0.055 second, it takes 6 Frames to cover 0.330 second. (But I think you overestimate the time it takes for the neuromuscular system to react to a startle-stimulus.) You overlook the time that sound takes to traverse about 270 feet from the 6th floor Depository window to Zapruder's ears --- about 1/4 second or 4 to 5 Frames. Thus the shots would be fired 10 to 11 Frames before the oscillations that begin at 181-182 and 220-221. As I think that the neuromuscular response takes about 1/6 second, you need subtract a total of only 7 or 8 Frames, thus putting the firing of the first two shots at Frames ~~at~~ 174 and 213. But let me remind you that you have no positive proof as yet that the oscillations at 181-182 and 220-221 are not "shock wave" responses, as is Frame 313. That is why I think it is high time that those, who express an interest in getting to the bottom of this thing, ought to behave like scientists by passing from the observational stage to the experimental stage and determine, by firing a gun near a man of Zapruder's make-up (age, etc.), how long it takes for his hand (holding a camera or a pen that is poised) to respond to a loud noise, and also to determine whether a shock wave shows up even if the gun is fired almost 100 yards away and the bullet comes no nearer than 50 yards away. Yesterday I spoke by phone with several authorities or investigators of the nervous system, but not a single one could answer the question of how long it takes for the human hand to respond to an unexpected noise. If you will use the facilities of your own department (and, if need be, of related departments) at Berkeley, you may become the foremost authority on the correct answer to this question.

I shall be glad to learn what you and your colleagues are able to ascertain regarding the actual time it takes for a man (like Zapruder) to respond to a rifle-shot, as evidenced in a tremor of the arm or hand. (I also welcome literature sources you may have on this subject.)

Your graph indicates that, in actual practice, when placing the time of the shots, you subtract only 3 or4Frames (equivalent to about 0.16 to 0.22 second). When calculating the time or Frame when Kennedy was hit, I would subtract 7 or 8 and then add 2 (for the time it took the bullet to travel) where Frames 220-221 are concerned, thus making the time of the hit to be at Frame 215. (He was about 180 feet from the Depository window; the velocity of the bullet is assumed to be about twice that of sound.)

Dr. Thompson mentions that the films used by the Warren Commission are a copy of a copy, and hence are not so clear as what one might be able to get if you were able to persuade LIFE magazine to lend a copy taken directly of the original Zapruder film in their vault. He shows examples of each to illustrate the difference in clarity.

I am sending "zeroxed" copies of your letters (to me) of August 15 and September 20 (with the two charts) to Dr. Josiah Thompson.

With many thanks for the time and energy you have given, and with hopes for reliable information on the actual time for a "startle-reaction," I remain

Gratefully yours,

Walter Menaker

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